

LArIAT Wire Chamber TDC Data in ROOT Format

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Background

- Wire chamber data should be converted from binary into root format for the use by larsoft
- Each wire chamber has 4 TDCs, 2 in X and 2 in Y
- Each TDC has 64 channels labeled from 0 to 63
- Each TDC controller controls 8 TDCs, i.e. 2 wire chambers

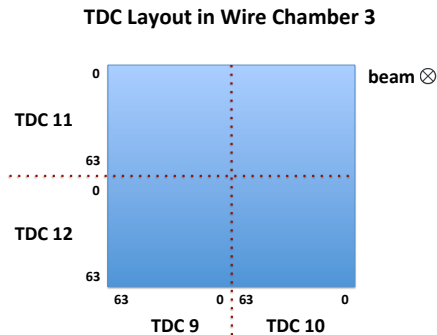


Figure 1: TDC layout on wire chamber 3.

Data Format

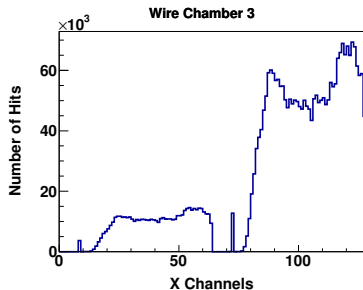
Each entry of the root tree is a spill.

- For each spill
 - TDCControllerHeader
 - vector of TDCSpillHeader from each TDC
 - vector of TDCEvent
 - vector of TDCEventHeader from each TDC
 - vector of TDCHit, each hit contains the TDC number, channel and time bin information.

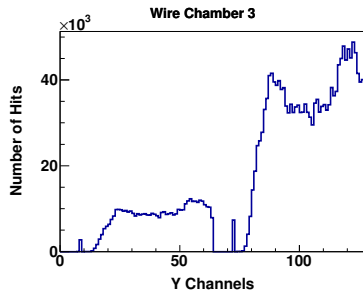
Note:

- the tree only supports 2 level containers, i.e. vector of vectors
- to set branch address to a class object, one has to build a dictionary before linking

Hit Position Distribution



(a) X position



(b) Y position

Figure 2: X and Y distribution of hits on a wire chamber for 200 spills. One wire for each bin. The pitch is 1 mm.

Hit Timing Distribution

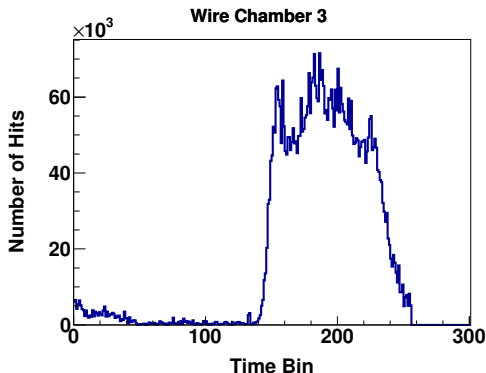


Figure 3: Timing distribution of all hits on a wire chamber for 200 spills.
1 bin = 1.2 ns.

Summary and Plan

In Summary,

- converted wire chamber TDC binary data into root file
- checked position and timing distribution of hits

In the future,

- scattered plot